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November 13, 1992

RECEIVED
NOV 16 1992
RCOM SECTION

Cynthia L. Hutchison
U.S.E.P.A., Region VII
726 Minnesota Avenue
Kansas City, KS 66101

RE: Steelcote Facility - St. Louis, Missouri
Docket No. VII-91-H-0025

Dear Ms. Hutchison:

Pursuant to paragraph 28 of the above-referenced Administrative Order on Consent, I am enclosing the status report for the month of October, 1992.

Please let me know if you have any questions.

Very truly yours,

Alphonse McMahon

Alphonse McMahon

AM/fmp
Encl.
cc: Douglas A. Niedt (w/encl.)
Donald McQueen (w/encl.)

STL-48423.1

STATUS REPORT

OCTOBER 1992
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

PLANNED ACTIVITIES

There were no planned on-site activities. It was anticipated that the groundwater situation as reflected in letters to USEPA dated 22 September 1992 and 12 October 1992 would be resolved (copies attached). As of the date of this report (13 November 1992), no response has been received from USEPA.

ACTUAL ACTIVITIES

The only activities that occurred consisted of developing the materials contained in the 12 October 1992 letter.

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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September 22, 1992 Z-301L3

Cynthia Hutchison
U.S.E.P.A. Region VII
726 Minnesota Avenue
Kansas City, KS 66101

Re: Steelcote Facility, St. Louis, MO

Dear Ms. Hutchison,

The purpose of this letter is to make the USEPA aware of an apparent ground water anomaly at the Steelcote Facility to which reference has been made in the previous monthly status reports. The following paragraphs provide a description of the situation, the activities that we have taken to date to resolve the situation, and our recommendations for additional activities to resolve the situation.

The anomaly consists of a steep ground water depression that extends between wells B and C (see attached figure). Both the gradient and the flow direction is not what was anticipated for the site and the steepness of the gradient is not typical for the area nor does it appear to be consistent with the type of material encountered during the borings (boring logs are attached). Numerous groundwater elevations were recorded during and between the first and second quarter sampling and relative levels have remained consistent. Sampling logs which present the ground water level measurements from the top of the casings are attached.

Work performed to date (in addition to frequent monitoring of groundwater levels) has included searching the archives of the Metropolitan Sewer District and the City of St. Louis engineers office, and meeting with appropriate personnel from the U.S. Army Engineers, St. Louis District, Missouri Dept. of Natural Resources, Division of Geology and Land Surveying and excavation contractors and drillers who frequently provide services in the Mill Creek area.

There are a number of possible causes which, acting singularly or in combination, could conceivably cause this situation. These are as follows:

1. Large volume water extraction. The ground water surface depression could be

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caused by pumping large volumes of ground water from adjacent properties. However, a visual search of the area and inquiries the city engineering department and drillers and excavators which work in the area along with a visual inspection resulted in no evidence of such activity.

2. Bedrock/alluvium related conditions. On occasion in an alluvial valley that abuts sedimentary rock, especially in situations where solutioning and mining of the rock or fire clay within the rock has occurred, anomalous ground water conditions can occur. This is a situation in which ground water passing through the bedrock, or solution features within the bedrock, comes into contact with alluvial materials. The ground water gradient in the alluvium between that portion of the alluvium which is adjacent to the bedrock and that portion of the alluvium further away can be relatively steep. This could possibly explain the situation at ground water monitoring well A, however it does not explain the situation at the northernmost well which is ground water monitoring well D.

3. Karst Topography. Sinkholes do occur throughout the area. It is conceivable that such a solution feature could be providing a drain. However, it seems likely that such a feature, if below the groundwater table, would be fully saturated and with no other factors acting, result in a shallow ground water gradient in such an environment.

4. Manmade Features. Buried structures, both draining and contributing, could also result in the anomalous conditions. Draining structures which may be present at the site, include underground storage tanks, old sewer systems and other abandoned structures such as steamlines.

It is known that an abandoned buried tank is present between wells B and C, where the depressed water levels occur. Personnel at the Steelcote Facility believe the tank is approximately 15,000 gallons in capacity and that the base of the tank is at or below the lowest detected level of groundwater. If such a tank were empty and were to have recently developed a leak it could be acting as a drain on the system. Note that the apparent configuration of the tank is consistent with the apparent shape of the depression.

A similar type of situation could occur with the existence of abandoned sewers below the depressed groundwater table. It is known that during the middle and late 1800's deep sewers were constructed in the Mill Creek area in a manner that if present would parallel the shape of the depression. Unfortunately, few records are available of these sewer systems and the search of the City Engineers and Metropolitan Sewer District archives failed to uncover any records of abandoned sewer systems in the area.

Other structures which are known to be present in the area but for which records are non-existent include abandoned steamlines.

Man made structures could also conceivably contribute to the high levels detected in wells A and D. The water lines that are present in the area are often unmapped and have a recent history of rupture. Nevertheless, the likelihood of two leaking water lines near both wells is small.

Below ground structures such as basements in the area are also known to flood during times of significant precipitation could conceivably be creating a mounding phenomenon. However, the only basement structure known in the area is the one that exists in a building immediately upgradient of well A. This could account for the high levels in well A, it would not account for the high levels detected in groundwater monitoring well D.

5. Non performing wells. Another potential cause is non-performing wells and in this case, specifically wells B and C. This situation sometimes occurs when auger wells are not sufficiently developed. When augering wells in areas such as Mill Creek where silts and clays are present, the walls of the well may become polished (smeared) and the smearing will act as a barrier to water passing into the annulus of the well. Generally, this "seal" is broken over time and/or during development activities when water is pumped from the well by forcing water from the surrounding strata into the annular space of the wells. The wells at the site are two inch inside diameter wells which were placed through 6 1/4 inch inside diameter hollow stem augers. As a result, between the outside wall and the casing in the wall of the boring there exists a thickness of nearly three inches of sand through which water has to be pulled during the pumping. This may not provide sufficient force to break the seal.

Given that the wells are approximately 60 feet deep, including 45 feet of screen through the saturated portion of the soil, it is unlikely that the wells are not performing. On the other hand, the soil logs indicate that moisture in the soil was encountered at approximately the same levels at all of the wells, that is, about 15 feet below the surface. This contrary evidence indicates that the wells are not performing and for that reason needs to be checked.

6. Variability of Strata Permeability. Visual observation of the soil borings did not indicate that significant strata changes relative to permeability were present. However, laboratory analysis indicates that some of the strata is relatively tight and it is conceivable that wells A and D are tapping upper level perched water, which is continually feeding the wells and maintaining an artificial high.

Prior to proceeding with any additional work, we suggest that performance of wells B and C be checked by a reverse slug procedure, that is, well casings be loaded with non-chlorinated water and that the drop in water level be monitored in order to determine whether or not water is passing beyond the annular space of the wells. This procedure would likely result in one of several scenarios, including:

1. The wells are performing properly and the anomalous conditions observed still

exist. This will most likely require additional subsurface investigation.

2. The wells are not performing properly and can be rehabilitated via use of other development techniques than originally used. Note that rehabilitation which will involve attempts to develop the wells via more radical techniques such as use of a surge block will require the development of a protocol. If rehabilitation works and anomalous conditions are still present, then most likely additional subsurface investigation will be required.

3. The wells are not performing properly and can be rehabilitated via use of other development techniques than originally used. Assume rehabilitation works and ground water conditions are as originally anticipated; that is, with a gentle gradient to the NNE. If this is the case, the existing wells are probably adequate.

4. The wells are not performing properly and cannot be rehabilitated. In this case, it will be necessary to reconstruct wells using other drilling techniques that those used to install the existing wells. Protocols will have to be developed for this action also.

Attached to this letter is a protocol for conducting the reverse slug test. Please review this material and provide comments. We will not proceed with this proposal until we have received USEPA's approval to do so.

If you have any questions, please call.

Sincerely,

Donald J. McQueen
Vice President

Enclosures: Technical Procedure 9, Well Performance Testing

cc: Mr. Doug Niedt
Mr. Alphonse McMahon

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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October 12, 1992

Z-301L4

Cynthia Hutchison
U.S.E.P.A. Region VII
726 Minnesota Avenue
Kansas City, KS 66101

Re: Well Design at Steelcote Facility, St. Louis, MO

Dear Ms. Hutchison,

The purpose of this letter is to respond to and, hopefully, resolve your comments in our phone conversation on October 8, 1992. Specifically, I am concerned about your comment that the well screens should be ten feet in length. I have reviewed the Plan of Study and direct your attention to the following items:

1. Section 2.2 Field Work--Initial Phase, page 12, 2nd paragraph which reads as follows:

   "Well construction specifics are presented in both the Technical Procedures as well as the QA/QC Plan. The wells will be screened from bedrock to approximately five feet above the ground water elevation encountered at the time of installation. This will allow equilibration of anomalous conditions which may result from penetrating perched water tables. In addition, it will allow for sampling of materials which are soluble and those insoluble fractions with specific densities greater or less than that of water."

   Given that bedrock occurred at approximately 60 feet from the surface and that moisture was encountered at approximately 15 to 20 feet for each boring, the resulting screen length for each well was 45 feet.

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2. TECHNICAL PROCEDURE 2, Monitoring Well Design and Installation, page 23, Casing and Screen Materials/Screen 1st sentence reads as follows:

"All monitoring well screen will be ten feet in length and will be constructed of PVC material similar to the well riser"

This statement is included in this section as a material specification for screens and does not affect the length of screened section in the wells.

3. VENDOR SPECIFICATIONS, 2.0 DRILLING OPERATIONS, 2.4 Well Construction, page 6, 1st paragraph, 2nd sentence reads as follows:

"The length of the screen and depth of placement will be determined by the site manager or his representative."

This statement indicates that the length of the screened section is to be determined in the field.

I hope that the preceding comments clarifies this apparent confusion. In addition to presenting these comments, I think that it is important to review why the total screen length was left open to field decision before additional work is performed at the site.

A phased approach is being applied to this site as is indicated in our description of the Scope of Work in the POS which includes Section 2.2 Field Work--Initial Phase and Section 2.3 Field Work--Subsequent Phases. You may recall that in our initial POS, we did not include ground water monitoring and recommended that such monitoring come in later phases after we had obtained subsurface information at the site via soil sampling. At your insistence, we agreed to conduct ground water monitoring to determine "if COCs were present in the ground water and to obtain information on ground water hydrology." Given that the COCs included chemicals that could occur anywhere in the wetted section of the alluvium and the potential complexity of the alluvium it was decided to screen the entire wetted section.

I hope that the information in this letter resolves this issue. If you have any questions, please call.

Sincerely,

Donald J. McQueen
Vice President

cc: Mr. Doug Niedt
Mr. Alphonse McMahon